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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/531,529   | 06/27/2005  | Menachem Nathan      | 085740-000000US     | 1927             |
| 20350 7590 08/03/2010<br>TOWNSEND AND TOWNSEND AND CREW, LLP<br>TWO EMBARCADERO CENTER<br>EIGHTH FLOOR<br>SAN FRANCISCO, CA 94111-3834 |             |                      |                     |                  |
| EXAMINER   |             |                      |                     |                  |
| SCULLY, STEVEN M   |             |                      |                     |                  |
| ART UNIT   |             | PAPER NUMBER         |                     |                  |
| 1795   |             |                      |                     |                  |
| MAIL DATE  |             | DELIVERY MODE        |                     |                  |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/531,529

**Applicant(s)**

NATHAN ET AL.

**Examiner**

Steven Scully

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 April 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 4-14, 16-26, 29-39 and 41-50 is/are pending in the application.
- 4a) Of the above claim(s) 1, 4-14, 16-25, 39 and 41-50 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 26 and 29-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**THIN-FILM CATHODE FOR 3-DIMENSIONAL MICROBATTERY AND METHOD FOR  
PREPARING SUCH CATHODE**

Examiner: Scully    S.N.: 10/531,529    Art Unit: 1795    July 30, 2010

**DETAILED ACTION**

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 5, 2010 has been entered. Claims 2-3, 15, 27, 28 and 40 were previously canceled and claims 1, 4-14, 16-25, 39 and 41-50 were previously withdrawn. Claims 1, 13, 14, 25, 26, 38, 39 and 50 have been amended. Accordingly, claims 26 and 29-38 are pending examination in the application.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Claim Rejections - 35 USC § 103***

3. Claim rejections of claims 26, 29, 30 and 32-38 under 35 U.S.C. 103(a) as being unpatentable over Nathan et al. (US6,197,450) in view of Noda et al. (US5,268,243) are withdrawn because the claims have been amended.

4. Claim rejection of claim 31 under 35 U.S.C. 103(a) as being unpatentable over Nathan et al. (US6,197,450) in view of Noda et al. (US5,268,243) and Rigal et al. (US4,346,153) is withdrawn because claim 26 has been amended.

5. Claims 26, 29, 30 and 32-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nathan et al. (US6,197,450) in view of Delnick et al. (US6,316,142).

With respect to claim 26, Nathan et al. disclose a microbattery, consisting of an anode, an electrolyte and a cathode on a perforated silicon wafer. The perforated conductive substrate includes a plurality of cavities formed therein, wherein the cathodic layer, electrolyte layer and anodic layer are deposited therein. See column 4, line 64- column 5, line 4; Figure 1A.

With respect to the cathodic material, Nathan et al. disclose a cathode material of  $\text{LiCoO}_2$ ,  $\text{LiNiO}_2$ ,  $\text{LiMn}_2\text{O}_4$ ,  $\text{TiS}_2$ ,  $\text{V}_2\text{O}_5$ ,  $\text{V}_3\text{O}_8$  or lithiated forms of the vanadium oxides. Nathan et al. do not disclose the claimed cathodic active material. Delnick et al. a battery comprising a negative electrode and a positive electrode with a separator therebetween. The positive electrode active materials include, for example, manganese oxide, lithiated manganese oxides, lithiated cobalt oxides, oxides of vanadium, or sulfides of cobalt ( $\text{CoS}_2$ ). See column 5, lines 49-59. It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute one known element ( $\text{CoS}_2$ ) for another to obtain predictable results because Nathan et al. and Delnick et al. disclose overlapping examples of the positive electrode active material

and one of ordinary skill in the art at the time of the invention would have thus expected the results of the substitution to have been predictable. *KSR International Co. v. Teleflex Inc.*, 550 U.S. \_\_\_, \_\_\_, 82 USPQ2d 1385, 1397 (2007).

With respect to claim 29, Nathan et al. disclose the substrate can be glass. Further, the substrate can optionally have a current collector. See column 2, lines 26-38.

With respect to claim 30, the claim limitations of claim 30 do not further limit the product of claim 29 because they are product-by-process limitations. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)

With respect to claims 32 and 34, Nathan et al. disclose the substrate is provided with a plurality of cavities with high aspect ratio, between about 2 to about 50, and with the anode, cathode, solid electrolyte layers and optional current collector layer being also deposited throughout the inner surface of the cavities. See claims 1 and 8.

With respect to claim 33, Nathan et al. disclose the cathodic layer, electrolyte layer and anodic layer are continuous. See Figure 1A.

With respect to claim 35, Nathan et al. disclose the cavities have a cylindrical geometry. See claim 9.

With respect to claims 36-37, Nathan et al. disclose the substrate material is made of a single crystal or amorphous material and is selected from glass, alumina, semiconductor materials for use in microelectronics, or ceramic materials, and the substrate material is preferably silicon. See column 3, lines 25-34.

With respect to claim 38, Nathan et al. in view of Noda et al. disclose positive active materials such as CoO and CoO<sub>3</sub>. See column 5, lines 15-31.

6. Claims 26, 29, 30 and 32-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nathan et al. (US6,197,450) in view of Palmer et al. (US4,416,915).

With respect to claim 26, Nathan et al. disclose a microbattery, consisting of an anode, an electrolyte and a cathode on a perforated silicon wafer. The perforated conductive substrate includes a plurality of cavities formed therein, wherein the cathodic layer, electrolyte layer and anodic layer are deposited therein. See column 4, line 64-column 5, line 4; Figure 1A.

With respect to the cathodic material, Nathan et al. disclose a cathode material of LiCoO<sub>2</sub>, LiNiO<sub>2</sub>, LiMn<sub>2</sub>O<sub>4</sub>, TiS<sub>2</sub>, V<sub>2</sub>O<sub>5</sub>, V<sub>3</sub>O<sub>8</sub> or lithiated forms of the vanadium oxides. Nathan et al. do not disclose the claimed cathodic active material. Palmer et al. a battery comprising a negative electrode and a positive electrode with a separator therebetween. The positive electrode active materials include, for example, an oxide or a sulfide of a transition metal such as titanium, vanadium, cobalt, or tungsten. See column 2, lines 46-63. It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute one known element (sulfides of cobalt or tungsten)

for another to obtain predictable results because Nathan et al. and Palmer et al. disclose overlapping examples of the positive electrode active material and one of ordinary skill in the art at the time of the invention would have thus expected the results of the substitution to have been predictable. *KSR International Co. v. Teleflex Inc.*, 550 U.S. \_\_\_, \_\_\_, 82 USPQ2d 1385, 1397 (2007).

With respect to claim 29, Nathan et al. disclose the substrate can be glass. Further, the substrate can optionally have a current collector. See column 2, lines 26-38.

With respect to claim 30, the claim limitations of claim 30 do not further limit the product of claim 29 because they are product-by-process limitations. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)

With respect to claims 32 and 34, Nathan et al. disclose the substrate is provided with a plurality of cavities with high aspect ratio, between about 2 to about 50, and with the anode, cathode, solid electrolyte layers and optional current collector layer being also deposited throughout the inner surface of the cavities. See claims 1 and 8.

With respect to claim 33, Nathan et al. disclose the cathodic layer, electrolyte layer and anodic layer are continuous. See Figure 1A.

With respect to claim 35, Nathan et al. disclose the cavities have a cylindrical geometry. See claim 9.

With respect to claims 36-37, Nathan et al. disclose the substrate material is made of a single crystal or amorphous material and is selected from glass, alumina, semiconductor materials for use in microelectronics, or ceramic materials, and the substrate material is preferably silicon. See column 3, lines 25-34.

With respect to claim 38, Nathan et al. in view of Noda et al. disclose positive active materials such as CoO and CoO<sub>3</sub>. See column 5, lines 15-31.

7. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nathan et al. (US6,197,450) in view of Delnick et al. (US6,316,142) as applied to claims 26, 29, 30 and 32-38 above, and further in view of Rigal et al. (US4,346,153).

With respect to claim 31, Nathan et al. disclose a carbon current collector. See column 6, lines 10-14. Nathan et al. do not disclose a conductive layer formed of at least one material selected from the group of claim 31. Rigal et al. disclose an electrode for a lead-acid storage cell. Rigal et al. disclose that current collectors have been used which are made of a material whose electric conductivity is higher than that of lead, such as copper. See column 1, lines 26-30. Further, copper is a well known metal for use as a current collector due to its good electrical conductivity and low electrical resistance. It would have been obvious to one of ordinary skill in the art at the time of the invention to use copper as the current collector of Nathan et al. because Rigal et al. teach that it has good electric conductivity.



8. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nathan et al. (US6,197,450) in view of Palmer et al. (US4,416,915) as applied to claims 26, 29, 30 and 32-38 above, and further in view of Rigal et al. (US4,346,153).

With respect to claim 31, Nathan et al. disclose a carbon current collector. See column 6, lines 10-14. Nathan et al. do not disclose a conductive layer formed of at least one material selected from the group of claim 31. Rigal et al. disclose an electrode for a lead-acid storage cell. Rigal et al. disclose that current collectors have been used which are made of a material whose electric conductivity is higher than that of lead, such as copper. See column 1, lines 26-30. Further, copper is a well known metal for use as a current collector due to its good electrical conductivity and low electrical resistance. It would have been obvious to one of ordinary skill in the art at the time of the invention to use copper as the current collector of Nathan et al. because Rigal et al. teach that it has good electric conductivity.

#### ***Double Patenting***

9. Double patenting rejections of claims 26 and 29-38 are withdrawn because Applicant has filed a Terminal Disclaimer.

#### ***Response to Arguments***

10. Applicant's arguments with respect to claims 26 and 29-38 have been considered but are moot in view of the new ground(s) of rejection.

***Contact/Correspondence Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Scully whose telephone number is (571)270-5267. The examiner can normally be reached on Monday to Friday 7:30am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571)272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. S./  
Examiner, Art Unit 1795

/Dah-Wei D. Yuan/  
Supervisory Patent Examiner, Art Unit 1795